REMARKS

Favorable reconsideration and allowance of this application are requested.

I. Discussion of Claim Amendments

In order to clarify the differences between the present invention and the cited references, prior claims 1-26 have been cancelled and replaced by new claims 27-50. In this regard, new independent claim 27 is somewhat similar to prior claim 1 except that the organic phosphorus compound (B) is required to be compounds represented by the formulae (3-1), (4-2) and (4-2), based on prior claim 10. The formula (3-1) corresponds to the case where "d" is 1 in the formula (3) of claim 10. The formula (4-1) corresponds to the case where "d" and "e" are 0 and Y^5 is a ring in the formula (4) of claim 10. The formula (4-2) corresponds to the case where "d" is 1 in the formula (4).

Although the original prior claim 10 defined groups represented by the formulae (2a), (3a) and (4a) as R, the applicants have deleted the formula (2a) in new claim 27, in accordance with the formulae (3-1), (4-1) and (4-2).

A compound represented by the formula (4c) has been added to new claim 35 (based on prior claim 11) which is supported by the original specification on page 48, lines 2-4.

Therefore, upon entry of this amendment, claims 27-50 will remain pending in this application for which favorable reconsideration and allowance are solicited.

II. Response to 35 USC §112 Rejection

The Examiner advanced a rejection of prior claims 712 under 35 USC §112, first paragraph. In this regard, the rejection is apparently based on the Examiner's contention that "c" in such prior claims cannot be zero because that case (1) is not a compound but a radical.

In response, the applicants have specified in the new claims that the organic phosphorus compounds are those corresponding to the formulae (3-1), (4-1) and (4-2). As apparent from these formulae, "c" can in fact be zero. Thus, the rejection advanced under 35 USC §112, first paragraph should be withdrawn.

III. Response to Art-Based Rejections

(1) The Examiner's position

The Examiner cites the following references and mentions that the present invention lacks novelty and is obvious over the cited references.

(i) JP-2002-69313(JP '313)
(ii) JP-6-166764 (JP '764)
(iii) JP5-311026 (JP '026)
(iv) USP 4,017,455 (Hoffman)
(v) USP4, 680,342 (Axeirod)
(vi) USP 7,109,286 (Tamura)
(vii) CN 1229816 (CN'816, corresponding to EP 0 943 653 Al (EP' 653))

(2) The Cited References

(i) JP-2002-69313 (JP '313)

JP' 313 discloses a stabilized flame-retardant synthetic resin composition comprising an organic phosphorus compound represented by the general formula (1), wherein a proportion of an organic acid compound in the synthetic resin composition is not more than 0.2% (claim 1).

JP' 313 discloses the compounds of the formulae (1-1) to (1-3) as the phosphorus compound (claim 3).

Regarding the effects of the disclosed composition, JP' 313 discloses that synthetic resin shaped articles excellent in physical and chemical properties, particularly excellent in transparency or electric properties of the shaped articles can be obtained ([0040]).

(ii) JP-6-166764 (JP' 764)

JP '764 discloses a flame resistant polyester-series thermosetting film which consists of three components of a polyester resin whose main terminal is a hydroxyl group, an organic phosphorus compound represented by the general formula (1), and a curing agent which reacts to the hydroxyl group, wherein the film is three dimensionally cross-linked (claim 1).

JP '764 discloses compounds 4 to 7 as the organic phosphorus compound ([0008]).

Regarding the effects of the invention, JP' 764 discloses that thermosetting films which are inexpensive and excellent in dimensional stability, anti-meltability and alkali resistance, satisfy both of flame resistance and flexibility, and do not generate poisonous gases in a state contacting to flame may be provided ([0027]).

(iii) JP5-311026 (JP '026)

JP '026 discloses a flame-retardant light diffusible methacrylic resin composition consisting of a methacrylic resin, a phosphorus-series flame retardant, barium sulfate and titanium oxide (claim 3).

JP '026 discloses, as the phosphorus-series flame retardant, triphenyl phosphate, 9,l0-dihydro-9-oxa-10-phosphahenanthren-l0-oxide, phenyl phosphonic acid, tris(tribromoneopentyl) phosphate and the like ([0007]).

Regarding the effects of the disclosed subject matter, JP' 026 discloses that the methacrylic resin composition and an extruded plate thereof have excellent light diffusion propoerties and flame retardancy, and good weather resistance and mechanical strength which are original features of a methacrylic resin ([0031])

(iv) USP 4,017,455 (Hoffman)

Hoffman discloses a flame-retarded composition comprising (1) a polyolefin selected from the group consisting of polyethylene and polypropylene or a linear, aromatic polyester selected from the group consisting of polyethylene terephthalate, polybutylene terephthalate and poly (1, 4-cyclohexanedimethylene) terephthalate and (2) a flame-retarding amount of a compound having the formula (claim 1)

Hoffman discloses that his novel flame-retardant compounds may be incorporated into the polymer in concentrations ranging from about 2% to about 20%, by weight, based on the weight of the polymer to which it is added (column 3, lines 21-26)

Hoffman also discloses that (1) is a polyolefin and there is incorporated therein (3) an ammonium polyphosphate at a ratio of (2) to (3) 1:1 to 1:3, respectively (claim 11) and in addition thereto (4) from about 0.5 to 5.0 percent, by weight, based on the weight of the polyolefin of a metal oxide (claim 12).

Various other additives may also be added to the instant flame-retarded compositions such as plasticizers, pigments, fillers, stabilizers, i.e., antioxidants etc., antistatic agents, dyes photochromics and the like (column 3, lines 59-63).

(v) USP 4,680,342 (Axelrod)

Axelrod discloses that a flame retardant polymer comprising units of the formula…R^3 is selected from the group consisting of alkyl having from 1 to 6 carbon atoms, alkenyl having from 1 to 6 carbon atoms, halogen and hydrogen (claim 1).

Axelrod also discloses a flame retardant thermoplastic composition, comprising an admixture of the polymer with a polyphenylene ether resin (claim 6).

In Example 3, Axelrod discloses the following subject matter:

> "A mixture of 70 parts by weight of poly(2,6-dimethyl-1,4-phenylene ether)resin , 30 parts by weight of the styrene copolymer of Example 2, 1.5 parts by weight of polyethylene, 0.15 part by weight of zinc sulfide and 0.15 part by weight of zinc oxide was extruded, and the extrudate was molded into standard 1/8 inch by 1/16 inch test pieces using a screw-type injection molding machine. A control mixture of the same ingredients in the same amounts was also prepared and molded, using the same conditions, except that the styrene copolymer was replaced with an equal amount of a non-phosphorylated polystyrene homopolymer and enough triphenyl phosphate to equalize the phosphorus content with that of the other blend".

Axeirod discloses that because of the outstanding flame retardancy of the blends, they are especially useful in commercial applications where flame resistance is a desirable feature, for example, as components in electrical products (column 5, lines 39—43)

(vi) USP 7,109,286 (Tamura)

Tamura discloses a phosphorus-containing hydroquinone derivative represented by a general formula (1) ...where R^1 and R^2 combine together to form a circular alkylene group; X represents an oxygen atom or sulfur atom; Y and Z represent a hydrogen atom, hydroxy group, linear or branched alkyl group, aralkyl group, alkoxy group, allyl group, aryl group or cyano group, and/or Y and Z may form a circular group (claim 1)

Tamura also discloses a flame-retardant epoxy resin composition comprising: a phosphorus-containing epoxy resin containing a structural unit derived from a phosphorus-containing hydroquinone derivative represented by a general formula (1): ... and a curing agent or a polymerization initiator (claim 6)

The quantity of the blended resins is not particularly limited, and the blended resins may be added to achieve the condition in which the P-containing quantity in the resins is 1-15% weight, and preferably 3-8% weight (column 14, lines 3-6).

The phosphorus-containing epoxy resins derived from the phosphorus-containing hydroquinone derivatives obtained according to the present invention provide better flame-retardancy, and are available for production in an industrially advantageous manner, and in addition, since the flame-retardant epoxy resin compounds including the phosphorus-containing epoxy resins, the curing agents or the polymerizing initiator exhibit better flame-retardancy and better chemical resistance, it is useful to use the compounds for adding flame-retardancy to printed wiring boards, copper-clad laminates, sealant used for electric parts, molding materials, casting materials, adhesives, electrically insulating paint materials and the like (column 23, lines 3-15)

(vii) CN 1229816 (CN '816, corresponding to EP 0 943 653 Al (EP' 653))

EP '653 corresponding to CN '816 discloses a polycarbonate-based flame retardant resin composition which comprises an aromatic polycarbonate (A), a styrene-based resin (B), a phosphoric ester compound (C) represented by the formula (I) and an organic phosphorus compound (D) represented by the formula (II) or (III), a ratio of a phosphorus concentration of the organic phosphorus compound (D) to that of the phosphoric ester compound (C), PD/Pc, being less than 2, which does not include 0 substantially, in the composition (claim 1).

Regarding the effects of the invention, EP '653 discloses that by using a phosphoric ester compound that is the component (C) and an organic phosphorus compound that is the component (D) together, it is possible to obtain a resin-molded product having excellent mechanical properties and high flame retardation that cannot be obtained by using a single of them ([0018]).

(3) Patentability of the Present Invention over the Cited references

The cited references fail to disclose or suggest a combination of a base resin, a specific organic phosphorus compound as defined in the applicants' claims and a flame-retardant auxiliary.

In this regard, JP' 026, Hoffman, Axelrod and EP' 653 do in fact disclose some types of phosphoric esters. However, the disclosed phosphoric esters are clearly structurally different as compared to the specific compounds of the formulae (3-1), (4-1) and (4-2) defined by the pending claims in the present application. Particularly, it will be observed that the phosphoric esters disclosed by the above-noted references do not have a ring corresponding to the rings Y^3 and Y^4 (and Y^5) of the formulae (3-1), (4-1) and (4-2) .

Moreover, JP '313 and JP'764 disclose aromatic compounds having a phosphaphenanthrene skeleton. The Examiner will observe that in such compounds, the phosphorus atom of the phosphaphenanthrene skeleton is directly bonded to an aromatic ring of the compounds such as a benzene ring. Further, although Tamura discloses a phosphorus-containing hydroquinone derivative, the derivative lacks either a bicylic phosphorus-containing ring or a linking group which indirectly bonds the phosphorus atom and a benzene ring (i.e., the phosphorus atom is directly bonded to the benzene ring similar to the above cases of JP '313 and JP '764). Thus, the compounds disclosed by JP '313, JP '764 and Tamura are clearly different in chemical structures from the specific compounds of formulae (3-1), (4-1) and (4-2) as defined in the applicants' pending claims. Additionally, JP '313, JP '764 and Tamura are silent on a concrete combination of a phosphorus-containing compound and a flame-retardant auxiliary.

Thus, the present invention is clearly distinct and would never be predicted from the cited references.

The present invention also shows unexpected results. That is, according to the present invention, since the specific organic phosphorus compound, the flame-retardant auxiliary and the base resin are combined, flame retardancy of the resultant composition can be improved and blooming is remarkably inhibited. Particularly, as apparent from the fact that the cited references are silent on blooming, inhibition of blooming in connection with a combination of the specific phosphorus compound and the flame-retardant auxiliary would never be motivated from the cited references. Therefore, the effects of the present invention would never be predicted from the cited references.

IV. Conclusions

The rejections advanced under 35 USC §§102 and 103 based on references (i)-(v) discussed above have been addressed and should therefore be withdrawn.

V. Fee Authorization

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Account No. 14-1140.

Respectfully submitted,

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